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Ontario Aquaculture Research and Services Committee

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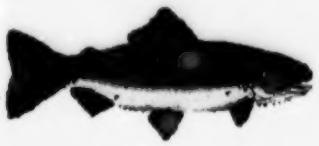

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EXECUTIVE SUMMARY

The Ontario Aquaculture Research and Services Co-ordinating Committee (OARSCC) has established a list of nineteen research and service priorities which it recommends to the Ontario Agricultural Services Co-ordinating Committee (OASCC) for 1998.

Rainbow Trout production for 1998 is estimated to be 4000 metric tonnes with significant production coming from the cage culture sector. This represents an increase of 5% over 1997. Fish farmers in Ontario recognize the efforts of the Ministry of Agriculture, Food and Rural Affairs in providing continuing funding for the services and research so essential to a developing industry, especially the provision of a new aquaculture specialist. The industry has special concerns with the Ministry of Natural Resources that Bill 139, the proposed Fish and Wildlife Conservation Act, does not provide the legislative framework to allow the industry to develop as a private property business separate from the regulation of a resource based activity. Although this framework was established in the Interim Aquaculture Policy Directives of 1995, it has not been incorporated into the new legislation.

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COMMITTEE ACTIVITIES

The Ontario Aquaculture Committee (OARSCC) serves as an expert committee and clearing house, providing combined industry-university-government reviews and opinions on proposed policies, regulations, research proposals and projects concerning aquaculture, in addition to its role as a commodity sub-committee in the OASCC structure. The Aquaculture Implementation Committee (AIC) will implement the Federal Aquaculture Development Strategy of 1995, and serve as a senior-level forum for resolving problems of a policy and legislative nature, both provincial and federal. The OARSCC will continue to provide a forum for working level discussion of problems affecting the industry.

For the fourth consecutive year, the industry has been invited to join the team which reviews and recommends the allocation of OMAFRA funds for aquaculture-related research and services under Program 42 at the University of Guelph.

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STATE OF THE INDUSTRY

The total estimated industry output for 1998 is approximately 4000 metric tonnes of food grade rainbow trout. This is an increase of 5% over 1997. While the industry has enjoyed a stabilization in the price of trout, the price of feed has increased as much as 10% in the last year. In addition to rainbow trout production, several new tilapia facilities have begun operation.

In the area of government relations, 1998 has again been a confusing and frustrating year. The fish farming industry is loosing the window of opportunity for investment and growth of the industry through new business starts. Investors are leaving the province in spite of the fact that there are 100 million potential customers within 24 hour shipping time of the province. Fish farming is an industry with potential for considerable growth, and the attendant jobs and prosperity.

In spite of the excellent efforts of OMAFRA and the University of Guelph to support the aquaculture industry and promote it as a burgeoning business, other Ontario government ministries do not seem to be operating in concert. Although OMNR and OMAFRA entered into a partnership agreement with the Ontario Aquaculture Association(OAA), in which they contributed funds in support of the OAA, and negotiated the Interim Aquaculture Policy Directives, the OMNR tabled Bill 139 Fish and Wildlife Conservation Act which completely ignored the existence of those same Policies. In the bill, ownership of farmed fish is not addressed. Deer and elk are recognized as farmed animals but fish are not. Fish farms are subject to regulation regarding harvesting and handling of wild fish stocks, and a 'License to Culture Fish' is not transferable, rendering a culture facility valueless for resale and risky at best as an investment vehicle.

The Ontario Ministry of Environment (OME) continues to apply its regulations inconsistently. Cage culture operations are not regulated while land based operations fall under different effluent

management strategies depending upon when the facility was built and where in the province it is situated

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EMERGING ISSUES

The perceived impact of fish farming on the environment has increased in importance in the last year. Government agencies need to work together to develop a unified perspective to deal with concerns and mitigate the effect of waste from aquaculture and all farming activities. A program of public education to identify the real issues, problems and methods of dealing with environmental impacts in a realistic and effective way is needed.

There continues to be no regulation of food safety for fish products which are both processed and sold within Ontario. A single incident of illness resulting from the consumption of an uninspected fish product will do irreparable harm to the industry by eroding consumer confidence in farmed products. The Ontario government should take steps to implement the existing Ontario Fish Inspection Act, or develop reasonable policies for the inspection and maintenance of food safety of domestically sold fish. The efforts of the Canadian Food Inspection Agency to harmonize existing international, federal, provincial, and municipal food production and handling regulations should be expedited. Government must also encourage our international trading partners to develop harmonized food safety regulations.

The Committee encourages and supports the creation of a level playing field for all private sector producers within the province. Current and proposed legislation, in the form of fish health regulations and introductions and transfer policy, continue to focus on the regulation of salmonids while the live importation, transport and sale of ornamental and other food species in Ontario continues unchecked. While trout represent the largest portion of domestic production, the trade in other species enjoys an unfair competitive advantage. In addition, funds which are available through government sponsored programs to encourage development in certain areas of the province are not accessible to producers in other areas.

The occurrence of diseases which are new to the Ontario industry, are being encountered as a result of the increase in the number of alternative species being cultured. The culture of these new species is taking place as a result of the expanded 'List of Species Allowed' which was adopted in the interim policy amendments of 1995. The capability to detect, treat and manage these diseases must be developed to ensure the growth of these new sectors of the industry.

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ACTION TAKEN ON 1997 RECOMMENDATIONS

The aquaculture industry has received continued support by

OMAFRA and the University of Guelph in both non-research and research activities including extension and veterinary diagnostic services. These services are essential for the growth and advancement of the industry and the University of Guelph continues to be the primary provider of these services in the province. In addition, OMAFRA has created and staffed the position of Aquaculture Specialist so that the on-farm needs of aquaculturists in Ontario can be addressed more effectively by that ministry.

Research projects investigating alternate protein sources in trout diets, nutritional requirements of charr, identification and treatment of bacterial diseases, stock identification and improvement, factors influencing fecundity of charr, influence of factors of fish products on consumer preference, and indicators and improvement of production have continued through the 1997-98 period. As well, new projects have been initiated in improved feeding strategies, energy value of carbohydrates, new sources of protein in trout diets, role of maternal stress in embryo success, the feasibility of using solar energy and develop ways to improve the welfare of farmed fish. Many of the 19 recommendations made in 1997 have been addressed by the University of Guelph in some way in the last year.

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PRIORITY RANKING SYSTEM

To rank individual recommendations, the committee used the following alphanumeric system to assign a relative level of priority.

The first number code identifies the priority of the research, where:

1. Very Important
2. Important
3. Desirable but Less Important Than Above Rankings

The second letter code identifies the level of research effort to be invested in that particular objective, where:

A. New Topic, No Known Research Underway
B. Expansion of Effort Needed, but Some Work Currently Underway
C. Continue Effort at Current Level
D. Decrease or Discontinue Effort

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DETAILED AQUACULTURE RESEARCH AND SERVICES RECOMMENDATIONS FOR 1998

The Ontario Aquaculture Committee recommends that research

and service activities be undertaken according to the specific objectives presented below. Both the recommendations by subject area and the individual objectives within each area are presented in the order of their priority to the aquaculture industry.

In the past, the industry has indicated agencies where individual recommendations should be directed for response. The comments received have been helpful. However, it is important to view the subject areas as integrated components of aquaculture as a whole. Therefore, the Committee recommends that the entire report for 1998 be sent to the agencies listed below. They should be asked to provide both comments and a description of research projects that they are either funding or directly undertaking to address the specific issues listed.
Canadian Agriculture Research Council (CARC)
Department of Fisheries and Oceans (DFO)
Environment Canada (EC)
Ontario Ministry of Agriculture Food and Rural Affairs (OMAFRA)
Ontario Ministry of Environment (OME)
Ontario Ministry of Mines and Northern Development (OMAND)
Ontario Ministry of Natural Resources (OMNR)
Natural Sciences and Engineering Research Council (NSERC)

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RECOMMENDATIONS

RECOMMENDATION #1: EXTENSION AND VETERINARY SERVICES (NON-R&D)

TO: OMAFRA AND U OF G PRIORITY: 1

BACKGROUND:

Since aquaculture is an emerging industry, there is a vital need for on-farm extension services to assist fish farmers to overcome problems and for transfer of technology and results derived from ongoing applied research, thereby improving productivity and competitiveness. Enhanced extension and on-farm diagnostic programs are required to improve assistance and disease control, and to establish training programs. On-farm visits improve communication, facilitate technology transfer and information dissemination, and allow first hand experience of on-farm conditions such as growing densities. The committee considers the maintenance of the non-diagnostic extension program of the Aquaculture Extension Centre as well as the diagnostic extension programs at the Ontario Veterinary College at the University of Guelph essential.

DETAILED OBJECTIVES:

1-B 1. Enhance extension services to include more on-farm consultations and communication, technology transfer workshops, information seminars, fact sheets and possibly short certificate courses for farmers to upgrade their skills.

1-B 2. Enhance the level of diagnostic clinical and on farm services to the commercial fish farming industry in Ontario.

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RECOMMENDATION #2: HEALTH MANAGEMENT AND DISEASE RESEARCH

TO: OMAFRA, U OF G. OMNR AND ARIO PRIORITY: 1

BACKGROUND:

The lack of registered therapeutants for aquaculture is a concern from both an environmental and a food safety point of view. The most common diseases of rainbow trout in Ontario farms are gill, and skin diseases which are estimated to cause an average of 30% annual losses expressed by numbers. New disease problems are being encountered as a result of the increase in alternative species cultured.

Research should be conducted to determine the aetiology and pathogenesis of economically significant diseases in an attempt to offer more effective measures of control and detection. The long-term objective is to determine the mechanisms of action of the diseases with a view to improving productivity.

DETAILED OBJECTIVES

1-B 1. Determine efficacy of chemicals commonly utilized in aquaculture, investigate alternatives such as vaccines, and compare them with each other for effectiveness.

1-B 2. Determine the pathobiology, and management of newly emerging diseases of warm water species, as well as the common gill and skin diseases of salmonids, on Ontario farms

1-C 3. Develop new detection and epidemiological techniques, and apply to on-farm examination.

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RECOMMENDATION #3: WASTE MANAGEMENT RESEARCH

TO: OMAFRA, UG, OMNR, OMEE, OAA, AND ARIO PRIORITY LEVEL: 1

BACKGROUND:

Aquaculture facilities tend to be custom designed to suit each available site, and little attention has been devoted to determining the relative efficiencies of different technologies and rearing systems. Current guidelines for aquaculture effluents do not encourage water conservation, nor do they address mass loading of nutrients discharged from aquaculture facilities. Thus, there is a need to develop production systems, feeding management practices, and other technologies that maximize the efficiency of culturing rainbow trout and other species while at the same time minimizing the environmental effects of this fish production.

DETAILED OBJECTIVES:

1-C 1. Investigate the application of process technology that encourages water conservation, reduces environmental effects and increases efficiency and profitability.

1-B 2. Investigate various approaches to mitigating the environmental impacts of cage culture operations.

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RECOMMENDATION #4: GENETICS, BREEDING AND REPRODUCTIVE CONTROL

TO:OMAFRA, U OF G, ARIO AND NSERC PRIORITY: 2

BACKGROUND:

Researchers should evaluate established Ontario rainbow trout strains under Ontario conditions with respect to spawning time, growth rate and disease resistance etc., and establish a breeding program to optimize these characteristics. Very little is known about the genetic make-up and potential for improvement of performance of the rainbow trout stocks cultured in Ontario, and we are therefore not fully exploiting the genetic potential of our domestic stocks of fish. The controlled manipulation of reproductive cycles, especially for Arctic charr, should be developed.

DETAILED OBJECTIVES:

2-C 1. Determine genetic variability, specific parameters, and gene-environment interactions which affect growth performance and disease resistance in rainbow trout, with the aim of improving those stocks.

2-C 2. Integrate molecular genetic technologies into freshwater aquaculture, and include gene mapping of desirable production traits and monitoring of existing rainbow trout, Arctic charr and other salmonid stocks.

2-C 3. Enhance reproductive cycle control through improved understanding of early developmental biology, and development of improved gamete quality and preservation methods. In particular look to address the serious problem with reproductive performance in the Arctic charr.

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RECOMMENDATION # 5: NUTRITION AND BIOENERGETICS RESEARCH

TO: OMAFRA, U OF G, OMNR, NSERC AND ARIO PRIORITY: 2

BACKGROUND:

Feed costs in aquaculture are high, constituting up to 60% of the unit cost of production of raising carnivorous fishes such as trout, charr, and salmon. The aim of this research is to maintain or reduce the present cost of feeding salmonids through diet reformulation and improved feed processing techniques, and to improve efficiency and reduce waste discharge by optimizing diets and feeding strategies.

DETAILED OBJECTIVES:

2-B 1. Investigate alternative protein sources for salmonid feeds to reduce dependency on expensive fish and soybean meals.

2-C 2. Develop production diets and feeding regimes suitable for those alternative species which have demonstrated potential for economic development in Ontario.

2-B 3. Develop appropriate feeds and strategies to improve feeding efficiencies and reduce the environmental impact of aquaculture effluents.

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RECOMMENDATION #6: FOOD PRODUCTS AND PROCESSING TECHNOLOGY RESEARCH

TO:OMAFRA, U OF G, OAA AND ARIO PRIORITY: 2

BACKGROUND:

In order to improve our competitive position against other red and white meat commodities, and to better challenge imports from other countries like the United States, there is a need to develop innovative, value-added products using rainbow trout and other domestically farmed fish species.

DETAILED OBJECTIVES:

2-B 1. Develop and refine advanced processing and packaging techniques to add value and assure food safety and quality, thus increasing the marketability of trout products.

2-B 2. Evaluate and develop new aquaculture products, with the aim of enhancing the value and marketability of Ontario's farmed fish. Utilize consumer testing and sensory evaluation studies to improve our understanding of consumer preferences.

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RECOMMENDATION #7: IMPROVE WELFARE OF FARMED FISH

TO:OMAFRA, U OF G, OAA AND ARIO PRIORITY: 2

BACKGROUND:

Objective methods of measuring animal response are needed for evaluation of the effect that current and alternative husbandry practices have on behaviour and stress in aquatic animals. This information will allow fish farmers to develop and adopt optimum culture practices and respond effectively to ethical concerns regarding the holding and husbandry of fish.

DETAILED OBJECTIVES:

2-B 1. Develop objective methods for assessing the general welfare of farmed fish through quantitative evaluation of their physiological responses to various husbandry and management practices

2-B 2. Establish husbandry protocols that maximize the health and welfare of farmed fishes, without sacrificing production performance or sustainability for the farming operation.

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RECOMMENDATION #8: ECONOMIC ANALYSES, INDUSTRY PROFILE AND MARKETING RESEARCH

TO:OMAFRA, U OF G, OAA AND ARIO PRIORITY: 3

BACKGROUND:

Certain market information and other 'Measures of Performance' are required to establish a competitive advantage for the Ontario aquaculture industry. This includes research focused on identifying key factors essential for industry success, and enhancing the impact of specific management skills and training programs designed to improve the profitability of aquaculture operations.

DETAILED OBJECTIVES:

3-C 1. Identify those management factors which most contribute to farm success and evaluate the best methods for enhancing them.

2-C 2. Continue the collection of the 'Aquastats' database for production management and forecasting of Ontario aquaculture.

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